# U.S. ARMY IONIZING RADIATION DOSIMETRY PROGRAM

# *Customer Handbook*

***Version 2.1***

Prepared by:

U.S. ARMY DOSIMETRY CENTER

REDSTONE ARSENAL, AL 35898-5000

# *Frequently Called Numbers*

## Whole-Body, Head & Neck, Wrist and Fetal Monitor Dosimetry

- *Customer Service* ..... DSN 746-7674
  Comm. 256-876-7674
- *Dose Questions* ..... DSN 746-2629
  Comm. 256-876-2629
- *Repository* ..... DSN 746-2412
  Comm. 256-876-2412

## Rings Dosimetry

- *Customer Service* ..... DSN 746-4648
  Comm. 256-876-4648
- *Dose Questions* ..... DSN 746-4648
  Comm. 256-876-4648
- *Repository* . ..... DSN 746-2412
  Comm. 256-876-2412

## Office of the Chief

- *Chief, USAIRDC* ..... DSN 746-1786
  Comm. 256-876-1786
- *Administrative Assistant* ..... DSN 746-1858
  Comm. 256-876-1858

# *Other Useful Resources and Information*

- Toll Free Number: 1-877-863-1461
- Fax: DSN 746-3816 or Comm. (256)–876-3816
- Email: irdb@redstone.army.mil
- Internet Address: < *under construction* >
- ALL (exposed and unexposed) dosimeters are to be shipped immediately back to the following address upon completion of the wearing period:

  COMMANDER
  U.S. ARMY AVIATION MISSILE COMMAND
  ATTN: AMSAM-TMD-SR-D (USAIRDC)
  BLDG 5417
  REDSTONE ARSENAL, AL. 35898-5000

- Supplies of DA Label 120, required for thermoluminescent dosimeters (TLD's) returned, should be requisitioned through your normal publications supply channels.
- Additional TLD hangers and TLD's may be obtained from this center upon your request. All unserviceable hangers should be returned to this center for replacement.
- If an overdose is suspected to have occurred at any time, that dosimeter(s) may be returned for emergency evaluation before the end of the wearing period. However, an unused dosimeter from the same wearing period, which can be used as a control, plus all pertinent information concerning the possible exposure, must also be shipped with the suspect dosimeter(s).
- All personnel changes (e.g. additions, deletions, corrections, "NOT USED") are to be entered on the Dosimeter Issue Listing (see page 14) using blue or black ink. No red ink, highlighter, yellow 'stickie', white out, pencil, etc., please. See page 13 for complete instructions.
- Avoid placing tape or anything sticky around the dosimeters when preparing to ship them to the center. However, normal rubber bands may be used, if necessary.
- To cancel your dosimetry service with this laboratory do the following:

  1. Collect ALL of the TLD's (used and unused) that are in boxes, drawers, etc. at your location.
  2. Collect ALL of the Dosimeter Issue Listings that go with the TLD's that were collected in step #1.
  3. Collect ALL of the TLD hangers and hanger openers furnished to you by this laboratory.
  4. Collect ALL of the TLD magazines or trays. Place the TLD's within the magazines.
  5. Write a letter stating that you want to cancel our service.
  6. Ship all of these items (1-5 just above) to the address given toward the top of this page.
  7. Upon receiving your shipment, this laboratory will acknowledge with a letter that your service has been terminated.

## Beneficial Badge Basics! ☺

USAIRDC realizes that a number of people frequently rotate in and out of Radiation Safety Officer (RSO) positions in the field. Probably many times the new RSO has little or no experience with badges and therefore may not know what to do with them. As a result the badges, which are needed for other customers, may just sit in a drawer or box for a long period of time. Actually these TLD's need to be shipped back to our laboratory. In order to prevent "badge pileups" and comply with regulations, the following simple steps are given to facilitate your use of our dosimetry service:

1. **By regulation,** we **ship** you dosimeters - otherwise known as TLD's (see page 8, Figure 1).

2. You **place** and **lock-in** the TLD's inside the plastic TLD hangers (see page 8, Figure 1) previously furnished by us. A TLD after being securely installed inside of a hanger is then known as "the badge".

3. You **hand out** the badges to personnel for use according to the Dosimeter Issue Listing of personnel names and TLD ID numbers that we send to you each wearing period.

4. At the end of the wearing period - you **remove** the TLD's from their hangers using a plastic **hanger opener**. (See the picture on page 9, Figure 2).

5. You **collect** the 'just used' TLD's along with our Dosimeter Issue Listing which shows the same TLD ID numbers as those ID numbers on the TLD's being returned. The numbers MUST MATCH before shipping them back to us! Reiterating, the numbers MUST MATCH before shipping them back to us!

6. **By regulation**, you immediately **ship back** to us the same TLD's plus the original of the Dosimeter Issue Listing. If you received the TLD's inside of a black, plastic magazine(s), then return the TLD's within the magazine(s), also. Do not worry about the **order** of the ID numbers of the TLD's inside each magazine. Just place the TLD's next to each other starting with slot #1.

7. You **keep** the carbon copy of the Dosimeter Issue Listing.

8. You **keep** the plastic TLD hangers for the next group of TLD's that you receive from us.

9. **Do not ever** just keep TLD's. All TLD's must be periodically calibrated at this laboratory. Therefore, all TLD's must be returned to us **ASAP** when the wearing period is finished.

10. **Do not ever** discard the TLD's for any reason. Since they contain lead, a special disposal process must be followed.

11. If you have **any TLD's laying around** in boxes or drawers from old wearing periods, just **ship them back to us as a separate group**. When in doubt, ship the TLD's to us.

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*Your continued assistance in returning the TLD's in a timely manner is appreciated!*

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Any questions? Please call Customer Service at DSN 746-7674 or Comm. 1-256-876-7674. Someone there will be more than happy to help you!

# CONTENTS

## 1. General

Purpose: The purpose of this handbook is to acquaint users with the TLD and to provide instructions for utilizing dosimetry services provided by the U.S. Army Ionizing Radiation Dosimetry Center (USAIRDC).

References: Publications, regulations, and forms applicable to the dosimetry service are:

(1) AR 11-9 (dated 28 May 1999)
(2) DA PAM 40-18 (dated 30 Jun 1995)
(3) SB 11-206 (dated 29 Aug 2002)
(4) DA Label 120 (dated 01 Apr 1969)
(5) 10 CFR 20 (dated 01 Jan 2002)
(6) 29 CFR 1910 (dated 01 Jan 2002)

Scope: This handbook contains information and instructions pertaining to the dosimetry service furnished by USAIRDC. In particular:

*Paragraph 2,* covers whole-body, neck, and wrist Panasonic 802 TLD's;
*Paragraph 3*, covers Harshaw DXT-RAD ring TLD's;
*Paragraph 4*, covers Central Dosimetry Record Repository (CDRR) information;
*Paragraph 5*, definitions;
*Paragraph 6*, appendices.

## 2. Whole-Body, Head & Neck, Wrist Badges and Fetal Monitors

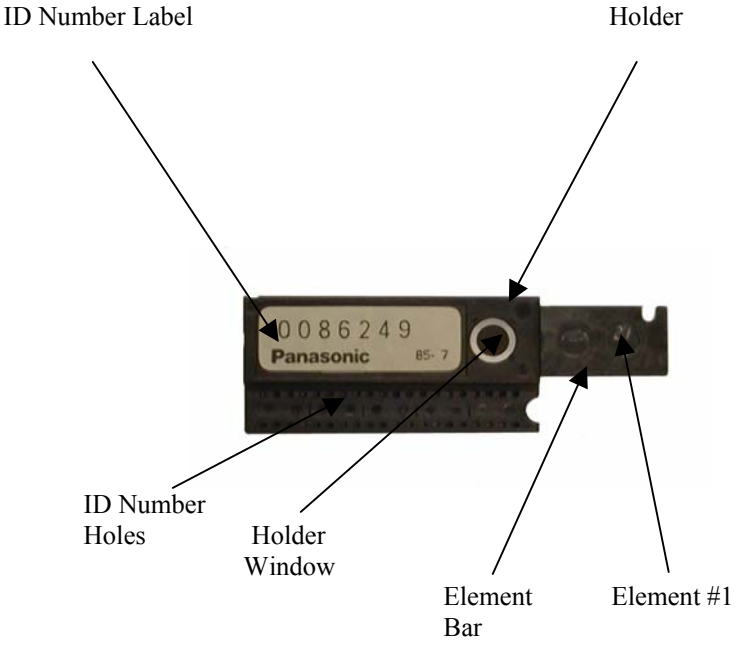
### General Information

The TLD is a reusable, state-of-the art personnel monitoring device that will detect x-ray, beta, gamma, and neutron radiation. It will NOT detect alpha radiation. Additionally, if the TLD is to be used for monitoring exposure to neutron radiation, the Dosimetry Center must be notified since special arrangements will be required to set up a neutron account.

The complete badge (whether whole-body, or wrist, or neck) consists of the four TLD elements, element bar & holder, plus the TLD hanger (see Figure 1).

AR 11-9 and DA PAM 40-18 provide guidance on the proper selection and use of the dosimeters.

## TLD




## HANGER

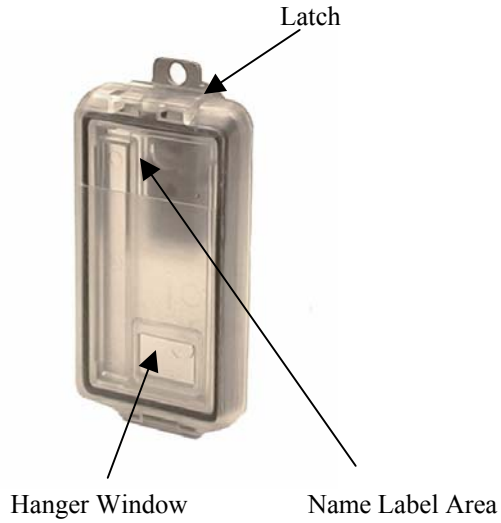



Figure 1. TLD + Hanger = Badge

### TLD Description

Thermoluminescence dosimetry is based upon the ability of certain materials (called phosphors) to store some of the energy they have absorbed from exposure to radiation and then release that energy in the form of a luminescent glow when heated by a reader at a later time. The intensity of that glow (i.e. released energy) can be related to the magnitude of the original exposure.

The Panasonic TLD for whole-body, neck and wrist Dosimetry employs four thin phosphor elements. Elements 1 and 2 are composed of copper-activated lithium borate and elements 3 and 4 consist of thulium-activated calcium sulphate. The phosphor elements are heated in the reader by pulses of infrared radiation from an incandescent lamp. The heating acts as a trigger to release the stored energy as luminescence, hence the term "thermoluminescence."

### Initial Requisitioning of Dosimetry Service

The USAIRDC supplies all primary TLD's for the Army and other authorized activities. All activities requiring Dosimetry service should send a letter of requisition directly to the Dosimetry Center. The initial requisition will include the following information:

a. The POC's name and complete telephone number; the account mailing address (including building

number/street address); plus the name, grade (or rank of military personnel), social security number, gender, and date of birth of each individual to be monitored.

b. The type and energy level of radiation to which each individual will be subjected. If energy levels are mixed or not known, a thorough description of the radiation devices or materials involved shall be furnished.

c. The source(s) license number/info (e.g. for NRC, ARA, state, reactors, LORAD x-ray machines, etc.)

d. A specific quantity of TLD's required for visitors.

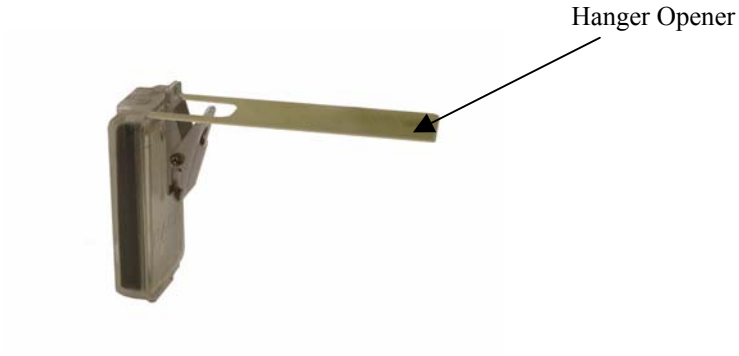
e. An additional quantity of spare TLD's equal to 1 percent of the total required (or a minimum of two TLD's). These are for replacement in the event of loss or damage to regular assigned TLD's.

f. A description of any unusual environmental conditions (such as high humidity, heat, chemical vapors, etc.) to which the TLD's will be subjected.

## Supply of TLD Hangers

A supply of TLD hangers is initially sent separately to each new customer and is retained for continuous future use. Only the TLD's are returned to USAIRDC for processing; the hangers stay with the customer. If the TLD's were received in black plastic magazines, then return the TLD's within the magazines. (See magazine related information on the next page).

The TLD hanger must not be used if the plastic, hanger window is punctured (see Figure 1). The rubber gasket on the TLD hanger must also be in place (see Figure 2). Damaged TLD hangers are to be returned to the address given on page 3.



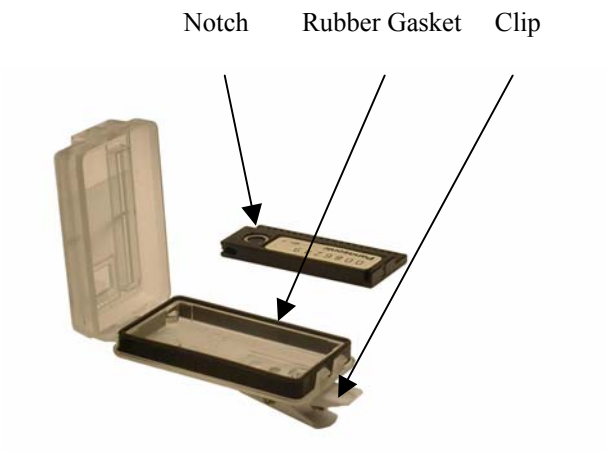




Figure 2. Removal of TLD from Hanger

A TLD hanger opener is included for unlocking the TLD hanger latch. By slipping the opener forks into the grooves at the top-back of the TLD hanger, the hanger can be easily opened (see Figure 2).

The TLD has a notch which only allows it to be put into the hanger one way. The correct orientation is shown in Figure 2. Ensure that the hanger is latched securely once the TLD is inside.

## Supply of TLD's

The TLD's are shipped in plastic trays, or magazines, which are used in the automated reading equipment. These magazines and the cardboard boxes which contain them must be used for returning the badges to USAIRDC. Small quantities of badges will be shipped in a small cardboard box without a magazine. CAUTION: never put tape or sticky labels around the TLD's; rubber bands only, if required.

Dosimetry service is normally initiated on a monthly wearing period basis except where the badges are to be used on a standby basis, such as nuclear accident/incident response teams. The initial shipment of TLD's will contain a sufficient quantity for one month's service (typically 28 days). Thereafter, TLD's will be shipped on a routine basis once each month (or quarter, as appropriate). In the interest of economy, the number of TLD's needed per wearing period should be periodically reviewed by the using installation and requests for adjustments, (either 'increases' or 'decreases') in quantities be forwarded to this center. Once a request for an 'increase' is received and logged in by the center, the 'increase' shipment can be sent to the customer without delay.

## Change of Wearing Period

After 3 months of monthly dosimetry service, the using activity will review the exposure records to determine the appropriate TLD wearing period: either continuation of monthly service or change to quarterly. USAIRDC will be notified of any changes in wearing cycle. Changes in the length of the wearing period are at the discretion of the using installation and must be requested by the account RSO.

## Use of TLD's

Detailed instructions on the wearing and handling of personnel dosimeters are given in DA PAM 40-18. (See Figure 3).

Accompanying each shipment of TLD's is a Dosimeter Issue Listing or 'user' listing (see Figure 5) of all TLD numbers contained in the shipment. For your convenience and ours, each TLD is pre-assigned by USAIRDC to a specific individual (name and SSN) and for a specific usage (whole-body, neck, wrist, etc.). Spare badges may be used for adding new personnel, visitors, etc. to the user listing. Any new badge assignments must be manually added to the user listing by the customer, next to the corresponding badge number. ALL information changes must be provided on the Dosimeter Issue Listing so that a proper record can be established at USAIRDC.

1) Each TLD number that has been assigned to your account for that wearing period is listed on the Dosimeter Issue Listing. Please DO NOT write 'on or over' any listed TLD number nor change any pre-assigned TLD number at any time. Doing so will delay your dose report since staff at the center must spend additional time deciphering these changes. Help us to get your report to you on time by refraining from making this type of change.

2) Do not use 'yellow stickies' or separate pieces of scrap paper to request changes of any kind or to indicate that a TLD was or was not worn. Scrap pieces of paper tend to get lost and consequently so

do your change requests. *ALL CHANGES MUST BE MADE DIRECTLY ON THE DOSIMETER ISSUE LISTING.*

3) Please legibly sign, date, print your name and write down your telephone number at the end of the Dosimeter Issue Listing. The telephone number permits this center to be able to contact you when questions arise.

4) Using Nuclear Regulatory Commission (NRC) License Codes on the Dosimeter Issue Listing:

a. Your assistance is needed in making sure that the correct NRC License codes are used on your Dosimetry Issue Listing. The Army Dosimetry Laboratory uses the NRC license codes as a method for tracking personnel exposures received under different radioactive material licenses and Army Radiation Authorizations (ARA). These codes correspond to the NRC license or ARA number under which an individual works while occupationally exposed to ionizing radiation. If you operate under more than one ARA or NRC license, then select the license with the greatest potential of external exposure.

b. Title 10 of the Code of Federal Regulations (CFR) Part 20.1101 requires that each NRC licensee perform a periodic review of their radiation protection program. To assist with this required review, the Army Dosimetry Laboratory provides a quarterly exposure summary to NRC licensees and ARA managers. The exposure summary is used to review and assess personnel exposures associated with a specific license or ARA. The accuracy of the exposure summary is dependent on the data that you provide us; therefore, we need you to ensure that the information is complete and up to date.

c. To update, change, or add the needed Data, please put the NRC license information on the "Dosimeter Issue Listing" which is provided with each shipment of dosimeters. Please review this information to assure that it is correct and reflects the NRC license or ARA currently in use at your facility. At the end of the listing ensure that all Nuclear Regulatory Commission (NRC) licenses, or Army Radiation Authorizations (ARA) covering radiation sources or equipment at your location have been itemized. For each individual, write the corresponding number from the itemized list, in the column labeled 'NRC', that indicates the license with the greatest potential of causing an external exposure.

d. To help you make sure that the data is accurate we are providing a list of NRC license and ARA numbers for various Army commodities. If you have any questions please contact the indicated POC below.

- BML 01-00126-19: Includes large area alpha sources, self contained and free air calibrators, POC: AMSAM-TMD-SR, DSN 746-8825; FAX DSN 746-3816

- BML 21-010222-05: Includes MC-1 moisture density gauges, POC: AMSTA-CS-CZ, DSN 786-7635; FAX DSN 786-5277

- BML 29-01022-14: Includes AN/UDM-2 and AN/UDM-6, POC: AMSEL-SF, DSN 987-3112 x6444; FAX DSN 992-6403

- BML 12-00722-06: Includes Tritium Collimators such as artillery, mortars, or M1 tank muzzle reference sensors, POC: AMSTA-LC-RS, DSN 793-2965; FAX DSN 793-6758. Please use this license number when submitting tritium bioassays.

- LORAD LPX160: Includes Lorad 160 KVp X-ray Machine, POC: AMSAM-SF, DSN 897-2114; FAX DSN 897-2111 or DSN 788-8643.

e. For radioactive material or radiation producing machines not listed above specify the appropriate NRC license, State license or permit number. For items not regulated enter '1' for 'None Applicable'.


Figure 3. Whole-body, neck, and wrist badge placement

Account Code: XYZ Wearing Period: 04/28/2002 - 05/25/2002

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I M P O R T A N T N O T I C E !!! I S S U E L I S T I N G S A R E L E G A L D O C U M E N T S !!!
T H E R E F O R E , T H E F O L L O W I N G I S R E Q U I R E D:

**********

<*> Please make all corrections directly on the original listing. Keep the carbon copy for your records, and RETURN THE ORIGINAL. The BADGES you return MUST MATCH those showing on the ORIGINAL issue listing you return. Use black or blue ink pens to make changes; no pencils or whiteout, please. UNDER NO CIRCUMSTANCES USE HIGHLIGHTER OR COLORED MARKERS; they degrade the quality of our microfilming process for LEGAL DOCUMENTS.

<*> Please use the badge assignments on this listing to the fullest extent possible. This listing is retained in a suspense file in our computer, and will be used to automatically report the dosimetry results when your badges are returned and processed. If you make any changes to this listing, the suspense file must be MANUALLY EDITED before your dosimetry results can be reported. You MUST make any changes or corrections which are necessary; however, any UNNECESSARY reassignments will only delay the reporting of your results.

<*> If you must change/correct a Name or Social Security Number, please draw a single line through the original entry and write in the correct information. We must be able to read the original entry in order to identify the proper record to change.

<*> Do NOT change the 'BADGE ID NO.' on the listing. If you must change a badge assignment, change the 'NAME' assigned to the badge. If you change the 'BADGE ID NO.', we cannot be certain that we have accounted for all badges.

<*> If you want a name removed from your listing, write 'DELETE' or 'D' in the 'COMMENTS' column. If you need to reassign the badge to a new individual, simply draw a single line through the original name and SSN, and write the new name and SSN. The original name will be deleted, and the new name added. When you write 'DELETE', we will assume the badge WAS USED during the period unless you indicate otherwise.

<*> If a badge was NOT WORN during the period, but you wish to RETAIN the individual's name on your listing, write 'NOT USED' in the 'COMMENTS' column.

<*> If you have assigned badges to visitors or temporary personnel, but do not want them permanently added to your listing, add their names and SSNs, but write 'VISITOR' or 'TEMPORARY' in the 'COMMENTS' column. This will ensure the badge results are properly reported, but the names will not appear on future listings.

<*> At the end of the listing, please report all Nuclear Regulatory Commission (NRC) licenses covering radiation sources in use at your location. If a source is not covered by a NRC license, then it is probably covered by a Department of Army Radiation Authorization (DARA) or Department of Army Radiation Permit (DARP), which should be reported instead. In the column labeled 'PRIMARY LICENSE', indicate for each individual the item number corresponding to the license covering the source which primarily causes his or her exposure. Note that many x-ray machines may not be regulated; for such devices, enter '(1)' for 'None Applicable'.

<*> Please note the 'DATE OF LISTING' in the upper right corner of each page of the printout. If your changes were not received at least ten (10) days prior to the 'DATE OF LISTING', we may not have had sufficient time to update your records in order to incorporate them into this printout. If so, then they should appear in the next issue.

<*> Finally, please SIGN and DATE the listing in the block provided. This listing is permanently retained by the Records Repository as the LEGAL RECORD of the dosimeter assignments indicated, along with the corresponding dosage results. Also, please list your telephone number. Most problems can be resolved quickly by telephone.

<*> OFFICE HOURS: Mon-Fri 0700-1630 CST MAIL: COMMANDER
PHONE: Toll free: (877)-863-1461 U.S. ARMY AVIATION MISSILE COMMAND
Commercial: (256)-876-7674/7634 ATTN: AMSAM-TMD-SR-D (USAIRDC)
DSN (AUTOVON): 746-7674/7634 BLDG 5417
FAX: Commercial: (256)-876-3816 REDSTONE ARSENAL, AL 35898-5000
DSN (AUTOVON): 746-3816
INTERNET: [Email: irdb@redstone.army.mil] [Web: < Sorry - under construction >

Figure 4. Sample Instruction Sheet for Dosimeter Issue Listing

Dosimeter Issue Listing - Official Use Only - Privacy Act Data
Account Code:XYZ Dosimeter Use dates - From 04/28/2002 To 05/25/2002

BADGE TYPE: Beta-Gamma Dosimeters
NOTE: See license information & RSO certification at end of listing.

Ship To:
COMMANDER
US ARMY TMDE SUPPORT CENTER
ATTN AMSAM-TMD-C-CR (CALIBRATION)
FT CARSON CO 80913-5025

--Dosimetry-Center-Use-Only:--

| | Shipped | Received |
|---|---|---|
| Date: | 04/05/2002 | |
| No.: | 6 | |
| Init.: | | |

Return To:
COMMANDER
U.S. ARMY AVIATION MISSILE COMMAND
ATTN: AMSAM-TMD-SR-D (USAIRDC)
BLDG 5417
REDSTONE ARSENAL AL 35898-5000
Phone 256-876-7634/7634 Fax256-876-3816
DSN 746-7674/7634 DSN 746-3816

Account Code: XYZ Wear Period: 04/28/2002 - 05/25/2002 (TLD'S Beta-Gamma)

| Mag | Sl | BadgeId | Assigned Name | Soc Sec No | USAGE | Dept | NRC | Comments/DOB/Add/Delete/Not Used |
|---|---|---|---|---|---|---|---|---|
| 001 | 01 | 0232590 | *CONTROL #01 | ZCD-10-2998 | CONTROL | 1 | 3 | |
| 001 | 02 | 0005622 | PUBLIC JOHN Q | 555-66-7777 | BODY | 1 | 3 | |
| 001 | 03 | 0012638 | DOE JANE B | 666-44-8888 | BODY | 1 | 3 | |
| 001 | 04 | 0260689 | STRAW PINE T | 777-88-9999 | BODY | 1 | 3 | |
| 001 | 05 | 0223921 | | | | | | DOB: |
| 001 | 06 | 0223780 | | | | | | DOB: |

NRC License, DARA, or DARP - please ;itemize below. For each person listed, enter the item (#) of her/his '-PRIMARY LICENSE-', in that column.

( 1) None Applicable
( 2) BML222222222
( 3) BML333333333
( 4) BML444444444
( 5) BML555555555
( 6)
( 7)
( 8)

RADIATION PROTECTION OFFICER MUST SIGN BELOW TO CERTIFY REVIEW OF THIS DOCUMENT:

X_____(RSO)
X_____(Print Name)
X_____(Date)
X_____(E-Mail)
X_____COMMERCIAL OR DSN

* The 'PRIMARY LICENSE' is the Nuclear Regulatory Commission (NRC) license, the Department of Army Radiation Authorization
* (DARA), or the Department of Army Radiation Permit (DARP) covering the radiation source which primarily causes the exposure.

Figure 5. Sample Dosimeter Issue Listing

## Control Badges

Control TLD's (zero or transit controls) are also designated on the Dosimeter Issue Listing. The control badges ARE NOT to be worn! Their purpose is to monitor the environment of the personnel badges at all times other than when the personnel badges are being worn. **Control badges are to be stored in a low radiation background area.** When personnel doses are calculated at USAIRDC the dose on the control badge is subtracted from the dose on the personnel badge to give the net dose to which the personnel badges were exposed. Therefore, the control badges must be kept in the same location that the personnel badges are stored when not being worn. The control badge is not to be used to monitor the working (radiation) environment. If a room monitor or source monitor is required, one of the spares should be so designated. Because the TLD's are processed by a computerized readout system, the ID labels on the TLD's must not be altered. However, another label with the user's name may be placed on the TLD hanger on the clear space at the front-top of the badge hanger (see Figure 1). The hanger label must not cover any of the elements. This is assured if the label only covers the clear space at the front-top of the hanger. Labels are supplied for the customer's use. Identification is to be placed on the hanger only. DO NOT mark or write on any dosimeter's ID label since the TLD will be reused by other customers.

## Storage of Badges

The TLD's should be kept inside the shipping box until they are loaded into the TLD hangers for the wearing period. Once the TLD's are loaded inside the hangers, the hangers are kept closed until after the end of the wearing period when the TLD's are removed for return to USAIRDC; this includes all assigned badges plus visitor, spare, and control badges. When not in use, the badges should be stored in a location which is approved by the Radiation Safety Officer (RSO). Each storage location: (1) must be in a cool, dry area close to the area in which the occupationally exposed individual works, yet outside of the areas where the radiation sources or devices are actually used or located; (2) be adequately shielded from ionizing radiation; and (3) contain at least one control badge. Do not refrigerate the badges because it is not necessary and will expose them to excessive humidity that will damage them. The badges should be protected from extreme environmental conditions such as high temperature, moisture, or chemical vapors. ALSO, BADGES MUST NEVER BE STORED WITH SOURCES AT ANY TIME!

## Return of TLD's

All TLD's including control dosimeters and those not worn must be returned to USAIRDC *immediately* at the end of the wearing period. If at any time an overdose is suspected to have occurred, that particular TLD should be forwarded to USAIRDC immediately for evaluation, along with all pertinent information related to the overdose. The TLD's should be prepared in the following manner:

a. Remove all TLD's including control TLD's from the hangers as described on page 4. Put the TLD's back into the magazines in which they were originally received, and the magazines back into their original boxes. (The TLD's can be placed into the magazines in any numerical order; it is not necessary to return them in the same order in which they were shipped.)

b. Verify that the information on the Dosimeter Issue Listing, which was shipped with the TLD's, is correct. Make any corrections or additions in pen and ink (BLACK OR BLUE), sign and date the corrected listing and enclose the original listing with the returned TLD's. Retain the carbon copy for your records. If the listing is not returned with the TLD's, it will be assumed to be correct as originally issued and results of the TLD's evaluations will be reported accordingly.

***PLEASE AVOID THE FOLLOWING COMMON ERROR***

**A common shipping error, when returning TLD's and the Dosimeter Issue Listing to this center, is to enclose the Dosimeter Issue Listing for the 'NEXT' wearing period (the one you just received with the fresh TLD's) with the TLD's from the 'JUST FINISHED' wearing period. Make sure that the Dosimeter Issue Listing you enclose is for the 'JUST FINISHED' wearing period and that the TLD's being returned are those showing on the 'JUST FINISHED' listing. In short, the ID numbers of the TLD's you are returning MUST be the same as those showing on the Dosimeter Issue Listing that you are returning. If not, then you have the wrong Dosimeter Issue Listing getting ready to be shipped back to the center! Stop and match up TLD's and listing before shipping.**

Pack TLD's adequately to protect them from damage in shipment. The TLD's are heavy and require sturdy, well secured containment. Place the original user listing in the same package containing the TLD's. Place a DA label 120 on the package, and address the package to:

COMMANDER
U.S. ARMY AVIATION MISSILE COMMAND
ATTN: AMSAM-TMD-SR-D (USAIRDC)
BLDG 5417
REDSTONE ARSENAL, AL. 35898-5000

*NOTE: The TLD's are to be returned via First Class mail or an equivalent expeditious means.*

TLD's from previous wearing periods, which were temporarily lost or for some other reason not returned along with the rest of the badges for that period, must be returned separately following the procedures above. TLD's for different wearing periods MUST NOT be manually listed on the current listing.

Since the TLD is a reusable device, it is important that ALL of them be returned, whether used, or not. Under no circumstance is the customer to retain or dispose of unused TLD's. All TLD's must be periodically calibrated, re-zeroed and re-issued to other customers. Thus, all TLD's must be returned.

## Evaluation of TLD's

USAIRDC will process and evaluate all TLD's, normally within 24 to 48 hours after receipt. The dose equivalent from all TLD's will be recorded and forwarded to the using activity. Where an overexposure is indicated, the commander of the using activity will be notified by telephone or electronic message, with notification to the Surgeon General, ATTN: AMCSG-R; AMC Safety, ATTN: AMCSF-P; and Walter Reed Medical Hospital, ATTN: MCHL-HP. Further, for suspected over-exposures that may be caused by radioactive commodities in the Army Supply System, the commodity command having logistical responsibility for the radioactive commodity should also be notified for compliance with AR 11-9 and DA PAM 40-18.

All TLD's returned to USAIRDC for processing are evaluated and dosages are reported exactly as indicated by TLD responses, minus the response(s) of the appropriate background control TLD's. It should be noted, however, that small doses have high uncertainties associated with them due to inherent limitations in measurement. TLD's, which receive small amounts of radiation, may indicate no exposure; likewise, small doses may be reported for TLD's not known to have been exposed. In general this uncertainty is great for exposures which are not very different from the natural background levels (typically 10 millirems per month). Inaccuracies remain large up to 2 or 3 times background levels.

When TLD's are evaluated, the following information is reported to the customer:

a. Dose equivalent at 0.007 centimeter depth in tissue. This is the summation of all beta and photon radiation doses at this tissue depth, and is referenced as "SHALLOW DOSE".

b. Dose equivalent at 0.300 centimeter depth in tissue. This is the summation of all beta and photon radiation doses at this tissue depth, and is referenced as "EYE DOSE".

c. Dose equivalent at 1.0 centimeter depth in tissue. This is the summation of all photon (x-ray and gamma) radiation doses at this tissue depth, and is referenced as "DEEP DOSE".

d. Neutron dose equivalent. Since neutron radiation is highly penetrating, equal doses are reported for SHALLOW, EYE and DEEP tissue depths.

## Extremity Monitoring

Hangers with wrist straps are available upon request for monitoring exposure to the hands and forearms. These hangers accept the same TLD type as the regular whole-body hangers; consequently, the TLD's must be used according to the badge code indicated on the user listing. The listing must correctly indicate whether a TLD was used as a whole-body or extremity monitor.

Ring badges are also available for monitoring exposure to hands, when appropriate. Paragraph 3 contains instructions for the use and handling of the ring TLD service.

*NOTE: It is emphasized that wrist badges must always be worn in addition to, not in lieu of, whole-body badges.*

## Fetal Monitors

a. A declared pregnant woman is defined in 10 CFR 20.1003 as a woman who has voluntarily informed the licensee, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

b. Title 10 of the Code of Federal Regulations (CFR) Part 20.1208 states that the licensee shall ensure that the dose equivalent to the embryo/fetus of a declared pregnant woman not exceed 0.5 rem (5 mSv) during the entire pregnancy. In addition, the regulation states that the licensee shall make efforts to avoid substantial variation above a uniform monthly exposure rate as to satisfy the 0.5 rem (5 mSv) limit. Reporting requirements for doses in excess of this limit are specified in 10 CFR 20.2203.

c. Unit/installation radiation safety personnel shall notify the NRC licensee of declared pregnancies. You must inform the NRC licensee of all declared pregnancies to meet the requirements of 10 CFR 20.1208. In addition, when a fetal badge is originally issued the Army Dosimetry Laboratory must be provided with the estimated date of conception. This allows tracking of the cumulative dose throughout the gestation period.

d. Fetal monitors are to be worn in addition to any previously provided personnel monitoring devices. The badge should be worn directly over the developing fetus.

e. For more information relating to prenatal radiation exposure please review NRC Regulatory Guide 8.13, *Instruction Concerning Prenatal Radiation Exposure.*

## 3. Ring Badges

General

A ring badge is used to measure the amount of ionizing radiation exposure to the hands of radiation workers. The ring badge is composed of a lithium fluoride phosphor secured in a plastic ring by a thin, plastic cap. The ring badge can be used to measure only shallow dose exposure to beta, gamma, and x-radiation. It CANNOT be used to measure alpha or neutron radiation. *The ring badges may be worn in addition to, not in lieu of, a whole-body badge supplied by USAIRDC.*

Supply of Ring Badges

Supplies of new ring badges will be included with shipments of whole-body TLD's. Customers do not need to mount ring TLD's in holders as is done with whole-body badges. The wearing period of the rings will coincide with the wearing period of the whole-body badges. Each shipment will contain the originally requested number of rings. In the interest of economy, requirements for rings should be periodically reviewed and requests for adjustments in quantities (either increases or decreases) shall be submitted to USAIRDC.

Figure 6. Harshaw DXT-RAD Ring

Identification of Ring Badges

Each ring badge is identified with a circular five-digit number and a corresponding bar code.

In a group of ring badges for a wearing period each ring badge has the same ID number on the ring, ring holder and Dosimeter Issue Listing. Each individual who requires a ring badge should be assigned the next 'SPARE' ring listed on the user listing. Individuals assigned a ring badge will wear the same ring throughout the wearing period. If needed, use a black ink pen to write the individual's name on the ring holder label. Ring holders will be orange, yellow, mint or lavender in color with a white label for the name and ring badge number. Each wearing period has a different color ring holder to lessen the possibility of wearing a ring badge for more than one wearing period.

The control rings, used to measure the amount of exposure of personnel rings during transit and during non-duty hours, also have identifying numbers.

## Use of Ring Badges

All personnel who use a ring badge should be instructed not to tamper with the badge. If the cap cover on the ring is removed or punctured, the TLD chip can be lost, or damaged to such an extent that no accurate evaluation is possible. Users should also be instructed to try to keep the ring badges as dry as possible. Even though the badges are moisture resistant prolonged exposure to moisture can cause adverse effects. The rings should also be protected from fumes and heat as much as possible. All ring badges must be stored with the control ring badge while not being worn. The storage area must be a location where the radiation background is as low as possible. DO NOT STORE BADGES CLOSE TO SOURCES.

Personnel wearing a ring badge should orient the ring on the finger so that the cap is toward the source. Figure 7 shows the ring orientation where the source is located above the hand. Had the source been below the hand, then the ring cap would have been placed in a downward position, on the same side as the palm. *If gloves are worn, the ring badge should be worn under the glove rather than on the outside of the glove.*

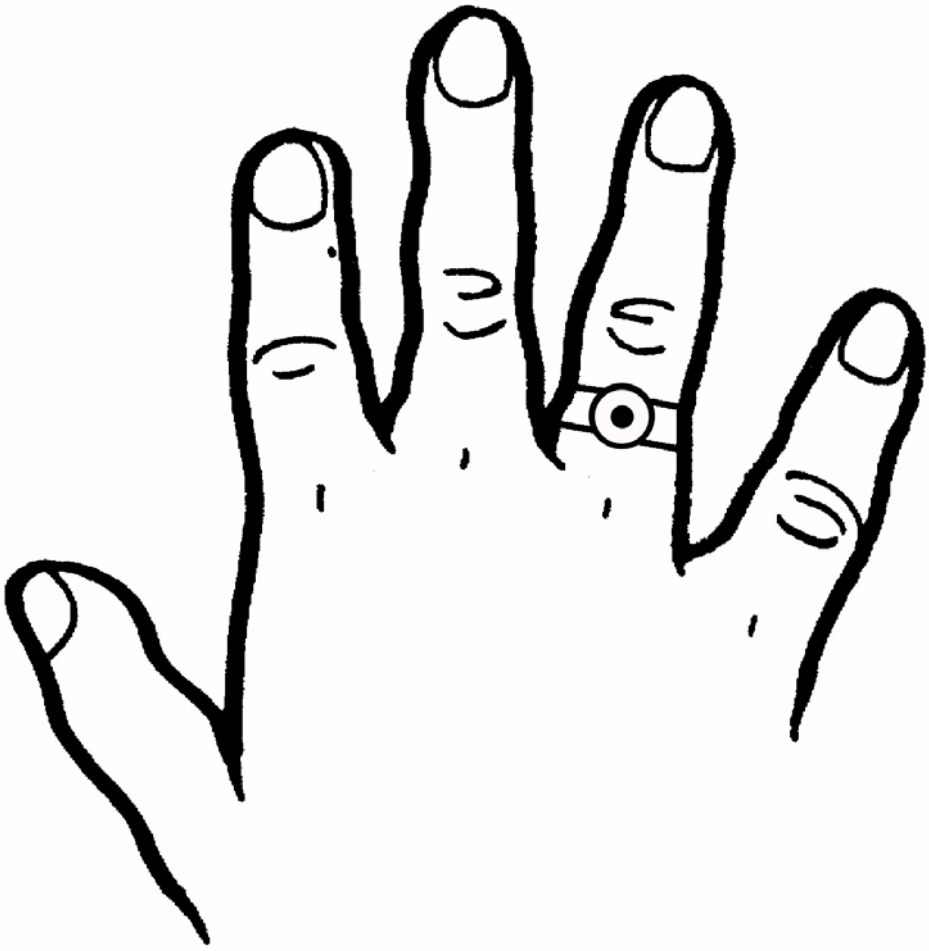

Figure 7. Ring badge placement

Return of Ring Badges

All ring badges, including the control rings and any unused rings must be returned to USAIRDC immediately after the end of the wearing period. They must be prepared as follows:

a. List the name, social security number, badge position usage i.e. right hand or left hand, and five-digit ring badge identification number on the issue listing provided. Separate listings must be prepared for the whole-body badges. If more than one control ring is used, clearly indicate which control ring was associated with each personnel ring.

b. Return all the ring badges (including the control rings) and the issue listings in the same package as the whole-body TLD's. As with the whole body, neck, and wrist TLD's, indicate on the Dosimeter Issue Listing the code(s) for the appropriate NRC license or ARA.

c. Ring badges from previous wearing periods which were temporarily lost or for some other reason not returned along with the rest of the badges for that period must be bagged separately. Ring badges for different wearing periods must not be written in on the current Dosimeter Issue Listing.

d. Address the package containing the dosimeters to the address shown on page 3.

Evaluation of Ring Badges

Upon receipt, USAIRDC will process and evaluate all assigned ring TLD's. The rings will normally be evaluated within 48 hours of receipt. In the event any ring badge indicates a dosage greater than 4.000 rem/month or 12.000 rem/quarter, a notification will be forwarded immediately via telegram to the using installation. A copy of each telegram will be transmitted to the Surgeon General, Department of the Army, and to Headquarters AMC.

Results of evaluations of the rings will be reported in units of rem equivalent at a tissue depth of 0.007 centimeters. The dose indicated by the control ring TLD will be subtracted from the dose indicated by the personnel ring badges and the net dose of the personnel rings reported to the using installation.

Records of personnel exposure to ionizing radiation should be maintained by the using installation in accordance with AR 11-9 and DA PAM 40-18.

## 4. Central Dosimetry Record Repository (CDRR)

General: A Central Dosimetry Record Repository is established at USAIRDC for the purpose of maintaining an ionizing radiation exposure history for each person who utilizes the Army dosimetry service. The results of all used dosimeters processed by USAIRDC will be entered into the automated record repository.

Reports of Exposure to Ionizing Radiation

a. **Record of Occupational Exposure to Ionizing Radiation.** This report is mailed to the customer, following evaluation of dosimeters, after each wearing period. It indicates exposure for the wearing period as well as cumulative exposure for the quarterly, yearly, and lifetime dose categories. An example of this report may be seen in Appendix A.

b. **History of Exposure to Ionizing Radiation.** The CDRR maintains an ionizing radiation exposure history for each person employed by DA, ARNG, and the Defense Logistics Agency (DLA) who is issued a DA dosimeter. Examples of reasons for requesting an exposure history are the following:

(1) An individual with prior Army radiation exposure transfers to an installation to perform work with ionizing radiation producing devices and his prior exposure records did not accompany him.

(2) The RSO wishes to reconcile an individual's DD Form 1141 with the automated Record of Occupational Exposure to Ionizing Radiation.

(3) Upon termination or at other times when requested by an individual.

Histories for individuals may be obtained by the RSO by making the request in writing to the CDRR. An example of a history report may be seen in Appendix B. The form in Appendix C may be reproduced and utilized by the RSO for history requests.

Note that if an individual history includes film badge doses, the following reporting convention for the evaluation of film may be helpful in interpreting these doses. Results in the Soft (Shallow) column include low energy gamma and x-ray of less than 20 keV effective energy and beta radiation, while results in the Hard (Deep) column include gamma and x-ray doses greater than 20 keV effective energy. Reporting conventions for TLD's are discussed in a previous section of this manual.

c. **Annual/Quarterly History of Exposure to Ionizing Radiation.** The 1st quarter, 2nd quarter, 3rd quarter, and annual/4th quarter reports are mailed out in July, October, January, and April, respectively. (A three month grace period follows the quarter ending to allow TLD's to be returned and processed). Two copies of this report are provided for each individual who wore a dosimeter provided by USAIRDC. These reports may be used in conjunction with the monthly Record of Occupational Exposure to Ionizing Radiation. The RSO should use one copy of the annual/4th quarter report to notify individuals of their annual exposure IAW the provisions of the Nuclear Regulatory Commission Regulations 10 CFR 19 or the Department of Labor Regulations 29 CFR 1910). See Appendix D for an example of the report.

d. **NRC Form 5.** The NRC Form 5 is provided on an annual basis in accordance with the requirements specified in 10 CFR 20.2206. This form provides a summary of all external and internal exposure received during the calendar year. It is the RSO's responsibility to review the requirements of 10 CFR 20.2206 to determine if they are required to submit an annual report to the NRC.

## Use of the Automated Dosimetry Report (ADR)

The RSO-

a. Verifies that all automated dosimetry record (ADR)-related information is contained in the ADR. The RSO and AIRDC must correct any errors by written correspondence.

b. Signs and dates the ADR to certify the information as the occupationally-exposed individual's official dose record.

c. Reviews and certifies each of the AIRDC updates and adds them to each occupationally-exposed individuals' record. The RSO need not retain the previous updates for calendar quarters 1, 2, and 3 once

replaced by the succeeding update. The 4th quarter report includes all dose data for the entire year and should be retained permanently by the RSO.

Thereafter, the RSO will review and certify each quarterly report received from CDRR and add it to the individual's record. Quarterly reports for the first three quarters need not be retained once replaced by the report (properly certified) for the succeeding quarter. A copy of the annual report should be maintained permanently in the individual's file. Records of exposure for whole-body and skin of the whole-body, head and neck, forearms and hands, and feet and ankles for an individual will appear together on the reports prepared by CDRR.

## Administrative Doses

When a person's dose equivalent cannot be determined because his primary badge has been lost or damaged, he will be assigned an administrative dose in accordance with DA PAM 40-18 which will be reported by the RSO of the customer to RSDL. Such report will contain:

(1) Name of individual
(2) Social Security Number
(3) Dosimetry Account Code for location (installation) where individual is assigned
(4) Administrative dose assigned (7 $mg/cm^2$, 300 $mg/cm^2$ and 1000 $mg/cm^2$ depth doses)
(5) Method of determining administrative dose
(6) Period of time covered by the administrative dose
(7) Authenticating signature of RSO

One of the following methods should be used to determine the administrative dose:

a. Calculate the affected occupationally exposed individual's dose based on occupancy or workload information and radiation exposure levels at the radiation source operator location.

b. Estimate the dose measured by a supplemental dosimeter if a primary dosimeter or official USAIRDC provided dosimeter is unavailable.

c. Average the person's previous occupational exposure over the preceding 6 to 12 months. This value may be used if the exposure during the period in question is not likely to have been significantly different from that of a similar period during the previous 6 to 12 months.

d. Estimate doses accrued by coworkers performing similar duties and having similar exposure opportunities.

The RSO should select the method that will determine the most accurate assessment. The administrative dose together with the method of determination and period of time covered by the dose should be forwarded to the CDRR for inclusion in the person's record. The form at Appendix E may be reproduced and used by the RSO for reporting the assigned administrative dose to the CDRR.

## Bioassay Results

IAW AR 11-9 and DA PAM 40-18, bioassay results will be forwarded to the CDRR on a quarterly basis for posting to the individual's automated Dosimetry file. The bioassay results forwarded to the USAIRDC will include the following information:

(a) Name, SSN, age, gender, and date of birth of the individual. (Sometimes an individual's personal

data does not already exist in the radiation worker database).

(b) The estimated intake (uCi), the isotope, the Committed Dose Equivalent (CDE) to the gonads, breast, lung, marrow, bone surface, thyroid, remainder, the Committed Effective Dose Equivalent (CEDE) to the whole body, the route of intake and the inhalation class (if applicable). Also required are the time or time period(s) of the exposure(s).

(c) Customer's dosimetry account code and the NRC license authorizing the material that was source of exposure.

(d) The license or ARA that covers the radioactive material. (This allows USAIRDC to send the dosimetry data to the licensee in addition to sending it back to the individual's organization if it happens to be different).

**A WORD OF CAUTION:** *Although email is a very convenient way of requesting dose history information, it is NOT a secure method of doing it. Please be advised that sending personnel names with their social security numbers over the internet for any reason is VERY RISKY; email is NOT secure and can be intercepted by others on the internet! For the sake of personal data security, we suggest that any customer request involving personnel names and social security numbers be sent to this laboratory through the mail. The mailed request can be presented as a copy of the completed form in Appendix C or a memorandum signed by the RSO. If desiring to expedite a history request, a FAX may be sent to this center for that purpose.*

## 5. Definitions

**Calendar Quarter**. A period of time not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin on the 1st, 2nd, 3rd, or 4th Sunday of January and subsequent quarters shall begin on the same Sunday of April, July, and October.

**Committed Dose Equivalent (CDE) ($H_{T,50}$)**. The dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

**Committed Effective Dose Equivalent (CEDE) ($H_{E,50}$ )**. The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues ($H_{E,50} = \Sigma\ W_T\ H_{E,50}$ )

**Control Dosimeter**. A dosimeter used to measure the ambient background dose equivalent or deterioration of badges that may occur in transit or storage (also called transit control). A group may have more than one control.

**Deep Dose Equivalent ($H_d$)**. Dose equivalent at a tissue depth of 1 cm (1000 mg/cm$^2$)

**Dose Equivalent (H)**. The quantity that expresses the effects of all radiations on a common scale for calculating the effective absorbed dose. It is defined as the product of the absorbed dose, the quality factor, and other modifying factors (H = D x Q). The unit of dose equivalent is the rem [the SI unit is the sievert (Sv), where 100 rem = 1 Sv].

**Dosimetry Account Code (Address Code)**. A two or three-letter code designator assigned by RSDL to the using installation to uniquely identify its dosimetry account. All correspondence or inquiries concerning an established dosimetry service must include the Dosimetry Account Code.

**Eye Dose Equivalent ($H_e$)**. Dose equivalent at a tissue depth of 0.3 cm (300 mg/cm$^2$)

**Issue Listing**. A computer printout which lists dosimeter assignments to individuals at the using installation or activity (replaces DA Form 3484).

**Magazine**. A plastic tray used for shipping, storing, and handling TLD's.

**Monthly Wearing Period**. The length of time from the 1st, 2nd, 3rd, or 4th Sunday respectively of the following month. Once each calendar quarter this wearing period will be 5 weeks long.

**Processing**. The physical process by which dosimeter response is measured and interpreted, that together yields the dose equivalent.

**Occupational Radiation Exposure**. Radiation exposure as a result of employment involving the use of radioactive material or equipment capable of producing ionizing radiation.

**TLD**. Thermoluminescent Dosimeter. A reusable solid-state device used to measure dose equivalent.

**Shallow Dose Equivalent ($H_s$)**. Dose equivalent at a tissue depth of 0.007 cm (7 mg/cm$^2$)

**TLD Badge**. A thermoluminescent dosimeter in a hanger. The hanger normally includes a holder, clip or strap for attaching to the wearer's clothing or wrist.

**TLD Hanger**. A plastic case which holds the TLD device and provides a means for attachment to clothing or the body.

**Total Effective Dose Equivalent (TEDE)**. The sum of the deep dose equivalent and the committed effective dose equivalent (CEDE).

**Total Organ Dose Equivalent (TODE)**. The sum of the deep dose equivalent and the committed dose equivalent recorded for the maximally exposed organ.

**Using Activity**. The installation, agency, or activity which uses the Army dosimetry service to measure the occupational radiation exposure of all or a portion of its personnel.

**Wearing Period**. The length of time during which a dosimeter is worn by the individual being monitored. The wearing period will be chosen by the using activity and can be monthly or quarterly. Initially, the dosimetry service is furnished for a calendar month period. This may be modified for monitoring on a quarterly basis.

## 6. Appendices. APPENDIX A (1 of 3)

FOR OFFICIAL USE ONLY
PRIVACY ACT DATA

DATE: 10-SEP-2002 RECORD OF OCCUPATIONAL EXPOSURE TO IONIZING RADIATION ACCT CODE: BC PAGE: 1
DEPARTMENT: 00

COMMANDER
WALTER REED ARMY MEDICAL CENTER
ATTN MCHL-HP (HEALTH PHYSICS OFFICE)
BLDG 41 RM 38
6900 GEORGIA AVE NW
WASHINGTON DC 20307-5001

FROM TO DOSIMETER RESULTS - First Run - No Rings
03-MAR-2002 06-APR-2002 ALL DOSES REPORTED IN REM

| DOS NR | DOS CD | SSN | NAME | NT CD | DOSE THIS PERIOD SHALLOW | EYE | DEEP | NEUTRON | DOSE THIS QTR SHALLOW | EYE | TEDE | DOSE THIS YEAR SHALLOW | EYE | TEDE | LIFETIME TEDE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2355 | 5A | ZCD101419 | 5 CONTROL #30 CARD | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 207620 | 5A | ZCD101419 | 5 CONTROL #30 CARD | | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 0 | AM | 123456789 | BARRLOW JOHNNY | | 0.000 | 0.000 | 0.000 | 0.018 | 0.019 | 0.001 | 0.018 | 0.019 | 0.001 | 0.013 |
| 67769 | DA | 123456789 | BARRLOW JOHNNY | M# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 97782 | DA | 123456789 | BARRLOW JOHNNY | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 167910 | AA | 123456789 | BARRLOW JOHNNY | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 217659 | AA | 123456789 | BARRLOW JOHNNY | M# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 3543 | AA | 456789123 | CARLOW JAMES | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 88374 | DA | 456789123 | CARLOW JAMES | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 0 | AM | 159487894 | DESOTOH JANE A | | 0.000 | 0.000 | 0.000 | 0.113 | 0.118 | 0.029 | 0.113 | 0.118 | 0.029 | 0.777 |
| 27578 | DA | 159487894 | DESOTOH JANE A | M# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 170795 | AA | 159487894 | DESOTOH JANE A | M# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 188854 | AA | 159487894 | DESOTOH JANE A | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 199941 | DA | 159487894 | DESOTOH JANE A | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 72998 | DA | 753869421 | DONLEY STAN RONNIE | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 199132 | AA | 753869421 | DONLEY STAN RONNIE | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 0 | AM | 159482634 | ELVIS ALEX G | | 0.043 | 0.045 | 0.002 | 0.043 | 0.045 | 0.002 | 0.043 | 0.045 | 0.002 | 0.219 |
| 30371 | AA | 159482634 | ELVIS ALEX G | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 50564 | AA | 159482634 | ELVIS ALEX G | M# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 95044 | DA | 159482634 | ELVIS ALEX G | M# | 0.043 | 0.045 | 0.046 | | | | | | | | |

**APPENDIX A (2 of 3)**

FOR OFFICIAL USE ONLY
PRIVACY ACT DATA

DATE: 10-SEP-2002 RECORD OF OCCUPATIONAL EXPOSURE TO IONIZING RADIATION ACCT CODE: BC PAGE: 2
DEPARTMENT: 14

FROM TO DOSIMETER RESULTS - First Run - No Rings
03-MAR-2002 06-APR-2002 ALL DOSES REPORTED IN REM

| DOS NR | DOS CD | SSN | NAME | NT CD | DOSE THIS PERIOD SHALLOW | EYE | DEEP | NEUTRON | DOSE THIS QTR SHALLOW | EYE | TEDE | DOSE THIS YEAR SHALLOW | EYE | TEDE | LIFETIME TEDE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 127130 | 7A | NPD104511 | 7 TEST #03 RAD THE | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 91755 | 7A | NPD104426 | 7 TEST #04 BLOOD B | | 0.000 | 0.000 | 0.000 | | | | | | | | |
| 217856 | 7A | NPD104426 | 7 TEST #04 BLOOD B | 3# | 0.000 | 0.000 | 0.000 | | | | | | | | |

THIS REPORT PREPARED BY:

COMMANDER
U.S. ARMY AVIATION MISSILE COMMAND
AMSAM-TMD-SR-D
ATTN: WILLIAM S. HARRIS, JR, CHP
BUILDING 5417
REDSTONE ARSENAL, AL 35898-5000

-- END OF REPORT --

## APPENDIX A (3 of 3)

DOSIMETRY CENTER
IONIZING RADIATION CODE SHEET
CODE DEFINITIONS

DOS CD
(DOSIMETER CODES)

| COLUMN 1 (LOCATION) | | COLUMN 2 (TYPE) | |
|---|---|---|---|
| A | WHOLE BODY | A | BETA GAMMA TLD |
| B | RIGHT HAND AND FOREARM | B | NEUTRON TLD |
| C | LEFT HAND AND FOREARM | C | BETA GAMMA ADMINISTRATIVE DOSE |
| D | HEAD AND NECK | D | NEUTRON ADMINISTRATIVE DOSE |
| E | RIGHT FOOT AND ANKLE | E | BETA GAMMA FILM |
| F | LEFT FOOT AND ANKLE | F | NEUTRON FILM |
| G | LENS OF EYE | G | BETA GAMMA TLD RING |
| S | GONADS | H | BETA GAMMA FILM RING |
| T | BREAST | I | GAMMA POCKET DOSIMETER |
| U | LUNGS | J | NEUTRON POCKET DOSIMETER |
| V | RED MARROW | K | BETA GAMMA OTHER |
| W | BONE SURFACE | L | NEUTRON OTHER |
| X | THYROID | M | WEIGHTED COMPUTATION OF AA AND DA |
| Y | REMAINDER | N | USAIRDC AMENDED DOSE |
| Z | EFFECTIVE BIOASSAY | Z | BIOASSAY |
| 1 | FETAL | | |
| 2 | UNREDUCED DATA | | |
| 4 | UNKNOWN USAGE | | |
| 5 | CONTROL, TRANSIT | | |
| 6 | ENVIRONMENTAL MONITOR | | |
| 7 | TEST | | |
| 8 | AUDIT | | |
| 9 | OTHER NON-PERSONNEL USE | | |

NOTE: FETAL BADGES, "DOSE THIS YEAR DEEP" REFLECTS TOTAL OF ALL "1" BADGES FOR LATEST PREGNANCY IN REPORT PERIOD.

NOTE CD
(NOTE CODES)

| COL 1 | COL 2 |
|---|---|
| A | DOSIMETER DAMAGED BY ENVIRONMENTAL CONDITIONS. |
| B | DOSIMETER DAMAGED BY LIGHT. |
| C | OTHER FACTORS PRESENT WHICH PREVENT EVALUATION. |
| D | IN ADDITION TO ANY REPORTED DOSE, DOSIMETER SHOWS EVIDENCE OF CONTAMINATION. |
| E | DOSIMETER EXPOSED OUT OF HOLDER. |
| F | DOSIMETER PARTIALLY DAMAGED. BEST POSSIBLE EVALUATION GIVEN. |
| G | SUPPLEMENTAL EXPOSURE DATA. |
| H | DATA OBTAINED FROM DOSIMETER NOT SUPPLIED BY DA. |
| I | DOSIMETER USED IN NON-STANDARD HOLDER. |
| J | DOSIMETER NOT RECEIVED FOR EVAL OR RECEIVED LATE. |
| K | ANOMALOUS DOSIMETER RESPONSE. |
| L | DOSIMETER APPEARS TO BE NON-UNIFORMLY EXPOSED. |
| M | SOURCE BADGES FOR AM WEIGHTED COMPUTATION |
| 1 | RSO DETERMINED DOSIMETRY RESULTS NOT REPRESENTATIVE OF PERSONNEL EXPOSURE. |
| 2 | SURGEON GENERAL DETERMINED DOSIMETRY RESULTS NOT REPRESENTATIVE OF PERSONNEL EXPOSURE. |
| 3 | DOSIMETER WAS ASSIGNED BUT NOT WORN. |
| 4 | SPARE DOSIMETER - NOT USED. |
| 5 | RSO DETERMINED DOSAGE ALREADY ACCOUNTED FOR. |
| 6 | ADMINISTRATIVE DOSE ASSIGNED BY DA RSO. |
| 7 | DOSE SUPERSEDED BY USAIRDC AMENDED DOSE |

NOTE: A "&" IN NOTE COL 2 EXEMPTS AA OR DA BADGE FROM WEIGHTED COMPUTATION IN AM BADGE.
NOTE: A "#" APPEARING IN COL 2 OF THE NOTE CODE MEANS THE REPORTED DOSE WAS NOT ADDED TO THE CUMULATIVE TOTAL.

DOSE REPORTING CONVENTION

1. THERMOLUMINESCENT DOSIMETERS (TLD): A SHALLOW DOSE EQUIVALENT (DEPTH OF 0.007 CM IN TISSUE) AND A DEEP DOSE EQUIVALENT (DEPTH OF 1.0 CM IN TISSUE) ARE REPORTED FOR ALL PHOTON AND BETA EXPOSURES. AN EYE DOSE EQUIVALENT (DEPTH OF 0.3 CM IN TISSUE) IS ALSO REPORTED FOR TLDS WORN SINCE 01 JAN 94. EQUAL SHALLOW, EYE AND DEEP DOSE EQUIVALENTS ARE REPORTED FOR NEUTRON EXPOSURES MEASURED.
2. RING TLD: ONLY THE SHALLOW DOSE EQUIVALENT (DEPTH OF 0.007 CM IN TISSUE) IS REPORTED.
3. BODY AND WRIST FILM DOSIMETERS (USED PRIOR TO 1990): BOTH A "SOFT" AND A "HARD" DOSE WERE REPORTED. THE "SOFT" DOSE IS THE DOSE AS MEASURED IN FREE AIR DUE TO ALL LOW ENERGY GAMMA AND X-RAYS OF LESS THAN 20 KEV EFFECTIVE ENERGY AND ALL BETA RADIATION. THE "HARD" DOSE IS THE FREE AIR DOSE DUE TO GAMMA RADIATION AND X-RAY WITH AN EFFECTIVE ENERGY GREATER THAN 20 KEV. "SOFT" AND "HARD" DOSES ARE SHOWN IN THE "SHALLOW" AND "DEEP" DOSE COLUMNS RESPECTIVELY. ONLY A HARD DOSE IS REPORTED FOR NEUTRON EXPOSURES MEASURED BY FILM DOSIMETERS.
4. BADGE CODES WHICH BEGIN WITH G, THE REPORTED DOSE IS THE DOSE EQUIVALENT AT A TISSUE DEPTH OF 0.3 CM.
5. THE "DOSE THIS QUARTER" AND "DOSE THIS YEAR" FIELDS CONTAIN ONLY THE SUM OF THE LENS OF EYE DOSES RECEIVED SINCE 01 JAN 94.
6. THE "TEDE" (TOTAL EFFECTIVE DOSE EQUIVALENT) COLUMNS UNDER THE "DOSE THIS QUARTER" AND "DOSE THIS YEAR" FIELDS REFLECT THE SUM OF ALL EXTERNAL DEEP DOSES AND SUM OF ALL COMMITTED DOSE EQUIVALENTS (CEDE).
7. BADGE CODE "AM" IS A WEIGHTED COMPUTATION. DEEP IS (1.5 X AA DEEP) + (0.04 DA DEEP). EYE IS FROM THE "DA" BADGE. SHALLOW IS THE LARGER OF SHALLOW FROM THE "AA" OR "DA" BADGE.

Version 1.0 End of Document 17 September 2002

## APPENDIX B (1 of 5)

FOR OFFICIAL USE ONLY
PRIVACY ACT DATA

DATE: 10 SEP 2002 HISTORY OF EXPOSURE TO IONIZING RADIATION - FULL HISTORY PAGE: 1

NAME > DOE JANE Q
SSAN OR ID NUMBER > 123456789
DATE OF BIRTH > 22 NOV 1963
DATE OF REGISTRATION > 14 SEP 1988
DEPARTMENT CODE > 05

SEX > F

ALL DOSES REPORTED IN REM

| PERIOD WORN FROM | TO | DOS NR | DS CD | ACCT CD | NT CD | DOSE THIS PERIOD SHALLOW | EYE | DEEP | NEUTRON | DOSE THIS QTR SHALLOW | EYE | TEDE | DOSE THIS YEAR SHALLOW | EYE | TEDE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MM/DD/YY | MM/DD/YY | | | | | | | | | | | | | | |
| 07/03/88 | 08/06/88 | 638 | AE | BC | | 000.000 | | 000.051 | | 000.000 | | 000.051 | 000.000 | | 000.051 |
| 07/03/88 | 08/06/88 | 220 | BG | BC | | 000.031 | | | | 000.031 | | | 000.031 | | |
| 08/07/88 | 09/03/88 | 7359 | AA | BC | | 000.008 | | 000.007 | | 000.008 | | 000.058 | 000.008 | | 000.058 |
| 08/07/88 | 09/03/88 | 87 | BG | BC | | 000.000 | | | | 000.031 | | | 000.031 | | |
| 09/04/88 | 10/01/88 | 9011 | AA | BC | | 000.021 | | 000.021 | | 000.029 | | 000.079 | 000.029 | | 000.079 |
| 09/04/88 | 10/01/88 | 119 | BG | BC | | 000.033 | | | | 000.064 | | | 000.064 | | |
| 10/02/88 | 11/05/88 | 403 | AA | BC | | 000.048 | | 000.046 | | 000.048 | | 000.046 | 000.077 | | 000.125 |
| 10/02/88 | 11/05/88 | 111 | BG | BC | | 000.110 | | | | 000.110 | | | 000.174 | | |
| 11/06/88 | 12/03/88 | 4799 | AA | BC | | 000.020 | | 000.019 | | 000.068 | | 000.065 | 000.097 | | 000.144 |
| 11/06/88 | 12/03/88 | 108 | BG | BC | | 000.020 | | | | 000.130 | | | 000.194 | | |
| 12/04/88 | 12/31/88 | 2221 | AA | BC | | 000.017 | | 000.017 | | 000.085 | | 000.082 | 000.114 | | 000.161 |
| 12/04/88 | 12/31/88 | 106 | BG | BC | | 000.016 | | | | 000.146 | | | 000.210 | | |
| 01/01/89 | 02/04/89 | 8646 | AA | BC | | 000.015 | | 000.014 | | 000.015 | | 000.014 | 000.015 | | 000.014 |
| 01/01/89 | 02/04/89 | 94 | BG | BC | | 000.017 | | | | 000.017 | | | 000.017 | | |
| 02/05/89 | 03/04/89 | 1203 | AA | BC | | 000.024 | | 000.023 | | 000.039 | | 000.037 | 000.039 | | 000.037 |
| 02/05/89 | 03/04/89 | 113 | BG | BC | | 000.030 | | | | 000.047 | | | 000.047 | | |
| 03/05/89 | 04/01/89 | 7539 | AA | BC | | 000.025 | | 000.024 | | 000.064 | | 000.061 | 000.064 | | 000.061 |
| 03/05/89 | 04/01/89 | 120 | BG | BC | | 000.053 | | | | 000.100 | | | 000.100 | | |
| 04/02/89 | 05/06/89 | 48 | AE | AR | | 000.000 | | 000.000 | | 000.000 | | 000.000 | 000.064 | | 000.061 |
| 04/02/89 | 05/06/89 | 13 | BG | AR | | 000.000 | | | | 000.000 | | | 000.100 | | |
| 04/02/89 | 05/06/89 | 143 | DE | AR | | 000.000 | | 000.000 | | | | | | | |
| 04/02/89 | 05/06/89 | 3575 | AA | BC | | 000.000 | | 000.000 | | 000.000 | | 000.000 | 000.064 | | 000.061 |
| 04/02/89 | 05/06/89 | 121 | BG | BC | | 000.000 | | | | 000.000 | | | 000.100 | | |
| 05/07/89 | 06/03/89 | 48 | AE | AR | | 000.000 | | 000.032 | | 000.000 | | 000.032 | 000.064 | | 000.093 |
| 05/07/89 | 06/03/89 | 143 | BE | AR | | 000.110 | | 000.000 | | 000.110 | | | 000.210 | | |
| 05/07/89 | 06/03/89 | 13 | BG | AR | | 000.250 | | | | 000.360 | | | 000.460 | | |
| 06/04/89 | 07/01/89 | 9301 | AA | AR | | 000.036 | | 000.034 | | 000.036 | | 000.066 | 000.100 | | 000.127 |
| 06/04/89 | 07/01/89 | 9302 | BA | AR | | 000.032 | | 000.032 | | 000.392 | | | 000.492 | | |
| 06/04/89 | 07/01/89 | 13 | BG | AR | | 000.160 | | | | 000.552 | | | 000.652 | | |
| 07/02/89 | 08/05/89 | 1963 | AA | AR | | 000.012 | | 000.012 | | 000.012 | | 000.012 | 000.112 | | 000.139 |
| 07/02/89 | 08/05/89 | 1778 | BA | AR | | 000.059 | | 000.059 | | 000.059 | | | 000.711 | | |
| 07/02/89 | 08/05/89 | 6 | BG | AR | | 000.260 | | | | 000.319 | | | 000.971 | | |
| 08/06/89 | 09/02/89 | 5636 | AA | AR | | 000.010 | | 000.010 | | 000.022 | | 000.022 | 000.122 | | 000.149 |
| 08/06/89 | 09/02/89 | 5637 | BA | AR | | 000.015 | | 000.015 | | 000.334 | | | 000.986 | | |

## APPENDIX B (2 of 5)

DATE: 10 SEP 2002 HISTORY OF EXPOSURE TO IONIZING RADIATION - FULL HISTORY PAGE: 2

NAME > DOE JANE Q
SSAN OR ID NUMBER > 123456789

| PERIOD WORN FROM | TO | DOS NR | DS CD | ACCT CD | NT CD | DOSE THIS PERIOD SHALLOW | EYE | DEEP | NEUTRON | DOSE THIS QTR SHALLOW | EYE | TEDE | DOSE THIS YEAR SHALLOW | EYE | TEDE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 03/20/97 | 03/20/97 | 0 | WZ | BC | | | | 000.000 | | | | | | | |
| 03/20/97 | 03/20/97 | 0 | XZ | BC | | | | 000.000 | | | | | | | |
| 03/20/97 | 03/20/97 | 0 | YZ | BC | | | | 000.000 | | | | | | | |
| 03/20/97 | 03/20/97 | 0 | ZZ | BC | | 000.000 | | 000.000 | | | | | | | |
| 03/26/97 | 07/11/97 | 0 | SZ | KCA | | | | 000.000 | | | | | | | |
| 03/26/97 | 07/11/97 | 0 | TZ | KCA | | | | 000.000 | | | | | | | |
| 03/26/97 | 07/11/97 | 0 | UZ | KCA | | | | 000.000 | | | | | | | |
| 03/26/97 | 07/11/97 | 0 | VZ | KCA | | | | 000.000 | | | | | | | |
| 03/26/97 | 07/11/97 | 0 | WZ | KCA | | | | 000.000 | | | | | | | |
| 03/26/97 | 07/11/97 | 0 | XZ | KCA | | | | 000.000 | | | | | | | |
| 03/26/97 | 07/11/97 | 0 | YZ | KCA | | | | 000.000 | | | | | | | |
| 03/26/97 | 07/11/97 | 0 | ZZ | KCA | | 000.000 | | 000.000 | | | | | | | |

THIS REPORT IS FURNISHED TO YOU UNDER THE PROVISION OF THE U S NUCLEAR REGULATORY COMMISSION REGULATIONS (10 CFR 20) OR THE DEPARTMENT OF LABOR REGULATIONS (29 CFR 1910). YOU SHOULD PRESERVE THIS REPORT FOR FUTURE REFERENCE.

THIS REPORT PREPARED BY:

COMMANDER
U.S. ARMY AVIATION MISSILE COMMAND
ATTN: AMSAM-TMD-SR-D (USAIRDC)
BUILDING 5417
REDSTONE ARSENAL, AL 35898-5000

-- END OF REPORT --

## APPENDIX B (3 of 5)

DOE JANE Q, 123456789 Account Current and Former Addresses Date: 10 SEP 2002 Page: 1

| Account Code | Current Address | Former Addresses |
|---|---|---|
| AR | From: 25 APR 1989<br>COMMANDER<br>USA MEDDAC<br>ATTN MCXP-PM-RP<br>310 FREEDOM DR<br>FT LEONARD WOOD MO 65473-8922 | |
| BC | From: 16 JUN 1988<br>COMMANDER<br>WALTER REED ARMY MEDICAL CENTER<br>ATTN MCHL-HP (HEALTH PHYSICS OFFICE)<br>BLDG 41 RM 38<br>6900 GEORGIA AVE NW<br>WASHINGTON DC 20307-5001 | |
| KCA | From: 12 DEC 1990<br>COMMANDER<br>WALTER REED ARMY MEDICAL CENTER<br>ATTN MCHL-HP (HEALTH PHYSICS OFFICE)<br>BLDG 41 RM 38<br>6900 GEORGIA AVE NW<br>WASHINGTON DC 20307-5001 | |

## APPENDIX B (4 of 5)

DOSIMETRY CENTER
IONIZING RADIATION CODE SHEET
CODE DEFINITIONS

DOS CD (DOSIMETER CODES)

| COLUMN 1 (LOCATION) | | COLUMN 2 (TYPE) | |
|---|---|---|---|
| A | WHOLE BODY | A | BETA GAMMA TLD |
| B | RIGHT HAND AND FOREARM | B | NEUTRON TLD |
| C | LEFT HAND AND FOREARM | C | BETA GAMMA ADMINISTRATIVE DOSE |
| D | HEAD AND NECK | D | NEUTRON ADMINISTRATIVE DOSE |
| E | RIGHT FOOT AND ANKLE | E | BETA GAMMA FILM |
| F | LEFT FOOT AND ANKLE | F | NEUTRON FILM |
| G | LENS OF EYE | G | BETA GAMMA TLD RING |
| S | GONADS | H | BETA GAMMA FILM RING |
| T | BREAST | I | GAMMA POCKET DOSIMETER |
| U | LUNGS | J | NEUTRON POCKET DOSIMETER |
| V | RED MARROW | K | BETA GAMMA OTHER |
| W | BONE SURFACE | L | NEUTRON OTHER |
| X | THYROID | M | WEIGHTED COMPUTATION OF AA AND DA |
| Y | REMAINDER | N | USAIRDC AMENDED DOSE |
| Z | EFFECTIVE BIOASSAY | Z | BIOASSAY |
| 1 | FETAL | | |
| 2 | UNREDUCED DATA | | |
| 4 | UNKNOWN USAGE | | |
| 5 | CONTROL, TRANSIT | | |
| 6 | ENVIRONMENTAL MONITOR | | |
| 7 | TEST | | |
| 8 | AUDIT | | |
| 9 | OTHER NON-PERSONNEL USE | | |

NOTE: FETAL BADGES, "DOSE THIS YEAR DEEP" REFLECTS TOTAL OF ALL "1" BADGES FOR LATEST PREGNANCY IN REPORT PERIOD.

NOTE CD (NOTE CODES)

| COL 1 | COL 2 |
|---|---|
| A | DOSIMETER DAMAGED BY ENVIRONMENTAL CONDITIONS. |
| B | DOSIMETER DAMAGED BY LIGHT. |
| C | OTHER FACTORS PRESENT WHICH PREVENT EVALUATION. |
| D | IN ADDITION TO ANY REPORTED DOSE, DOSIMETER SHOWS EVIDENCE OF CONTAMINATION. |
| E | DOSIMETER EXPOSED OUT OF HOLDER. |
| F | DOSIMETER PARTIALLY DAMAGED. BEST POSSIBLE EVALUATION GIVEN. |
| G | SUPPLEMENTAL EXPOSURE DATA. |
| H | DATA OBTAINED FROM DOSIMETER NOT SUPPLIED BY DA. |
| I | DOSIMETER USED IN NON-STANDARD HOLDER. |
| J | DOSIMETER NOT RECEIVED FOR EVAL OR RECEIVED LATE. |
| K | ANOMALOUS DOSIMETER RESPONSE. |
| L | DOSIMETER APPEARS TO BE NON-UNIFORMLY EXPOSED. |
| M | SOURCE BADGES FOR AM WEIGHTED COMPUTATION |
| 1 | RSO DETERMINED DOSIMETRY RESULTS NOT REPRESENTATIVE OF PERSONNEL EXPOSURE. |
| 2 | SURGEON GENERAL DETERMINED DOSIMETRY RESULTS NOT REPRESENTATIVE OF PERSONNEL EXPOSURE. |
| 3 | DOSIMETER WAS ASSIGNED BUT NOT WORN. |
| 4 | SPARE DOSIMETER - NOT USED. |
| 5 | RSO DETERMINED DOSAGE ALREADY ACCOUNTED FOR. |
| 6 | ADMINISTRATIVE DOSE ASSIGNED BY DA RSO. |
| 7 | DOSE SUPERSEDED BY USAIRDC AMENDED DOSE |

NOTE: A "&" IN NOTE COL 2 EXEMPTS AA OR DA BADGE FROM WEIGHTED COMPUTATION IN AM BADGE.
NOTE: A "#" APPEARING IN COL 2 OF THE NOTE CODE MEANS THE REPORTED DOSE WAS NOT ADDED TO THE CUMULATIVE TOTAL.

DOSE REPORTING CONVENTION

1. THERMOLUMINESCENT DOSIMETERS (TLD): A SHALLOW DOSE EQUIVALENT (DEPTH OF 0.007 CM IN TISSUE) AND A DEEP DOSE EQUIVALENT (DEPTH OF 1.0 CM IN TISSUE) ARE REPORTED FOR ALL PHOTON AND BETA EXPOSURES. AN EYE DOSE EQUIVALENT (DEPTH OF 0.3 CM IN TISSUE) IS ALSO REPORTED FOR TLDS WORN SINCE 01 JAN 94. EQUAL SHALLOW, EYE AND DEEP DOSE EQUIVALENTS ARE REPORTED FOR NEUTRON EXPOSURES MEASURED.
2. RING TLD: ONLY THE SHALLOW DOSE EQUIVALENT (DEPTH OF 0.007 CM IN TISSUE) IS REPORTED.
3. BODY AND WRIST FILM DOSIMETERS (USED PRIOR TO 1990): BOTH A "SOFT" AND A "HARD" DOSE WERE REPORTED. THE "SOFT" DOSE IS THE DOSE AS MEASURED IN FREE AIR DUE TO ALL LOW ENERGY GAMMA AND X-RAYS OF LESS THAN 20 KEV EFFECTIVE ENERGY AND ALL BETA RADIATION. THE "HARD" DOSE IS THE FREE AIR DOSE DUE TO GAMMA RADIATION AND X-RAY WITH AN EFFECTIVE ENERGY GREATER THAN 20 KEV. "SOFT" AND "HARD" DOSES ARE SHOWN IN THE "SHALLOW" AND "DEEP" DOSE COLUMNS RESPECTIVELY. ONLY A HARD DOSE IS REPORTED FOR NEUTRON EXPOSURES MEASURED BY FILM DOSIMETERS.
4. BADGE CODES WHICH BEGIN WITH G, THE REPORTED DOSE IS THE DOSE EQUIVALENT AT A TISSUE DEPTH OF 0.3 CM.
5. THE "DOSE THIS QUARTER" AND "DOSE THIS YEAR" FIELDS CONTAIN ONLY THE SUM OF THE LENS OF EYE DOSES RECEIVED SINCE 01 JAN 94.
6. THE "TEDE" (TOTAL EFFECTIVE DOSE EQUIVALENT) COLUMNS UNDER THE "DOSE THIS QUARTER" AND "DOSE THIS YEAR" FIELDS REFLECT THE SUM OF ALL EXTERNAL DEEP DOSES AND SUM OF ALL COMMITTED DOSE EQUIVALENTS (CEDE).
7. BADGE CODE "AM" IS A WEIGHTED COMPUTATION. DEEP IS (1.5 X AA DEEP) + (0.04 DA DEEP). EYE IS FROM THE "DA" BADGE. SHALLOW IS THE LARGER OF SHALLOW FROM THE "AA" OR "DA" BADGE.

Version 1.0 END OF DOCUMENT 17 September 2002

## APPENDIX B (5 of 5)

DATE 10 SEP 2002 SUMMARY OF EXPOSURE TO IONIZING RADIATION PAGE 1

NAME > DOE JANE Q
SSAN OR ID NUMBER > 123456789

**********

RADIATION EXPOSURE RECORDED OUTSIDE THE ARMY

| DDE | LDE | SDE, WB | SDE, ME | CEDE | CDE | TEDE | TODE |
|---|---|---|---|---|---|---|---|
| 000.000 | 000.000 | 000.000 | 000.000 | 000.000 | 000.000 | 000.000 | 000.000 |

RADIATION EXPOSURE RECORDED WITHIN THE ARMY

| DDE | LDE | SDE, WB | SDE, ME | CEDE | CDE | TEDE | TODE |
|---|---|---|---|---|---|---|---|
| 002.475 | 001.323 | 002.351 | 041.644 | 000.027 | 000.874 | 002.502 | 003.349 |

TOTAL RADIATION EXPOSURE RECORDED

| DDE | LDE | SDE, WB | SDE, ME | CEDE | CDE | TEDE | TODE |
|---|---|---|---|---|---|---|---|
| 002.475 | 001.323 | 002.351 | 041.644 | 000.027 | 000.874 | 002.502 | 003.349 |

SIGNATURE OF MONITORED INDIVIDUAL DATE SIGNED CERTIFYING ORGANIZATION SIGN OF DESIGNEE DATE SIGNED

---

DEFINITIONS:
DDE: DEEP DOSE EQUIVALENT EXPOSURE.
LDE: LENS OF EYE EXPOSURE.
SDE, WB: SHALLOW DOSE EQUIVALENT, WHOLE BODY.
SDE, ME: SHALLOW DOSE EQUIVALENT RECORDED FOR THE SKIN OF THE EXTREMITY RECEIVING THE MAXIMUM DOSE.
CEDE: COMMITTED EFFECTIVE DOSE EQUIVALENT.
CDE: COMMITTED DOSE EQUIVALENT RECORDED FOR THE MAXIMALLY EXPOSED ORGAN.
TEDE: TOTAL EFFECTIVE DOSE EQUIVALENT, THE SUM OF DDE AND CEDE.
TODE: TOTAL ORGAN DOSE EQUIVALENT, THE SUM OF DDE AND CDE.

THIS REPORT IS FURNISHED TO YOU UNDER THE PROVISION OF THE U S NUCLEAR REGULATORY COMMISSION REGULATIONS (10 CFR 20) OR THE DEPARTMENT OF LABOR REGULATIONS (29 CFR 1910). YOU SHOULD PRESERVE THIS REPORT FOR FUTURE REFERENCE.

-- END OF REPORT --

## APPENDIX C

PCN V60QD10034A

FOR OFFICIAL USE ONLY
PRIVACY ACT DATA

DATE: 09-JUL-2002 ANNUAL/QUARTERLY HISTORY OF EXPOSURE TO IONIZING RADIATION ACCT CODE: BC PAGE: 1

NAME DOE JANE Q
SOC SEC NR or ID NR 123456789
DATE OF BIRTH 01-AUG-1963
DEPARTMENT CODE 05
SEX F

ALL DOSES REPORTED IN REM

| PERIOD WORN FROM | TO | ACCT NR | DOS NR | DOS CD | NOTE CD | DOSE THIS PERIOD SHALLOW | EYE | DEEP | NEUTRON | DOSE THIS QTR SHALLOW | EYE | TEDE | DOSE THIS YEAR SHALLOW | EYE | TEDE | LIFETIME TEDE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL OF WHOLE BODY DEEP DOSE PRIOR TO 2002: | | | | | | | | | | | | | | | | 2.439 |
| mm/dd/yy | mm/dd/yy | | | | | | | | | | | | | | | |
| 01/06/02 | 03/02/02 | BC | 207382 | AA | | 0.020 | 0.022 | 0.022 | | 0.020 | 0.022 | 0.022 | 0.020 | 0.022 | 0.022 | 2.461 |
| 01/06/02 | 03/02/02 | BC | 7473 | BG | | 0.311 | | | | 0.311 | | | 0.311 | | | |
| 03/03/02 | 04/06/02 | BC | 153074 | AA | | 0.000 | 0.000 | 0.000 | | 0.020 | 0.022 | 0.022 | 0.020 | 0.022 | 0.022 | 2.461 |
| 03/03/02 | 04/06/02 | BC | 3470 | BG | | 0.164 | | | | 0.475 | | | 0.475 | | | |

FOR DOSIMETER CODES SZ, TZ, UZ, VZ, WZ, XZ, AND YZ THE REPORTED DOSE REFLECTS THE COMMITTED DOSE EQUIVALENT (CDE) FOR THE DOSE THIS PERIOD AND THE TOTAL ORGAN DOSE EQUIVALENT (TODE) FOR THE DOSE THIS YEAR. FOR DOSIMETER CODE ZZ THE REPORTED DOSE REFLECTS THE COMMITTED EFFECTIVE DOSE EQUIVALENT FOR THE DOSE THIS PERIOD AND THE TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE) FOR THE DOSE THIS YEAR.

THIS REPORT IS FURNISHED TO YOU UNDER THE PROVISIONS OF THE U S NUCLEAR REGULATORY COMMISSION REGULATIONS (10 CFR 19) OR THE DEPARTMENT OF LABOR REGULATIONS (29 CFR 1910). YOU SHOULD PRESERVE THIS REPORT FOR FUTURE REFERENCE.

BC COMMANDER
WALTER REED ARMY MEDICAL CENTER
ATTN MCHL-HP (HEALTH PHYSICS OFFICE)
BLDG 41 RM 38
6900 GEORGIA AVE NW
WASHINGTON DC 20307-5001

-- END OF REPORT --

**APPENDIX D**

# REQUEST FOR HISTORY OF EXPOSURE TO IONIZING RADIATION

TO: COMMANDER
U.S. ARMY AVIATION MISSILE COMMAND
ATTN: AMSAM-TMD-SR-D (USAIRDC)
BLDG 5417
REDSTONE ARSENAL, AL. 35898-5000

FROM: _____
_____
_____
_____

ACCT. CODE: _____

1. An individual exposure history is requested for the following person:
   (a) Name_____
   Last First Middle
   (b) Maiden name (if applicable) _____
   (c) Date of Birth_____ (d) SSN_____

2. List all known places of exposure: _____
   _____
   _____
   _____

3. In case other information is needed, please provide the following for the POC *(if different from the undersigned*):
   Name _____ Telephone # (_____)_____
   Email Address _____

NOTE: If this requested History is to be provided to a non-DOD installation, then include a signed release of information statement from the individual.

| | | |
|---|---|---|
| Signature of RSO: | | |
| Print Name: | | |
| Date: | | |
| Telephone #: | DSN: | Commercial: ( ) - |
| FAX #: | | |
| Email Address: | | |

*NOTE: Copies of this form must be made by the customer.*

**APPENDIX E**

# REQUEST FOR ASSIGNMENT OF ADMINISTRATIVE DOSE

TO: COMMANDER
U.S. ARMY AVIATION MISSILE COMMAND
ATTN: AMSAM-TMD-SR-D (USAIRDC)
BLDG 5417
REDSTONE ARSENAL, AL. 35898-5000

FROM: _____
_____
_____
_____

ACCT CODE _____

1. IAW DA PAM 40-18, I request an administrative dose be entered into the record of:
Name _____ SSN_____

2. Reason for assigning dose: _____
Method used for determining dose: ___ Occupancy information & exposure levels
___ Average of previous dose ___ Supplemental dosimeter ___ Coworkers dose estimate

3. Wearing Period covered by admin dose: From _____ To _____ (mm/dd/yyyy)

4. Assign administrative dose below (see notes):

| Dosimeter # | Region of body | Shallow dose | Eye Dose | Deep Dose | Neutron Dose |
|---|---|---|---|---|---|
| _____ | _____ | _____ rem | _____ rem | _____ rem | _____ rem |
| _____ | _____ | _____ rem | _____ rem | _____ rem | _____ rem |
| _____ | _____ | _____ rem | _____ rem | _____ rem | _____ rem |

Notes: 1. Region of body refers to whole-body, hand and wrist, head and neck, or feet an ankles. 2. Shallow dose is the dose received at a depth of 7 mg/cm$^2$ of body tissue; eye dose is the dose received at a depth of 300 mg/cm$^2$ of body tissue; deep dose is the dose received at a depth of 1000 mg/cm$^2$ of body tissue. 3. For hand and wrist or feet and ankles, enter shallow dose only. 4. All doses must be entered in rem units (for example: Enter 10 mrem dose as 0.010 rem).

5. Was person named above working at your installation during period for which administrative dose is assigned? Yes__ No__ if not, provide address of work location.

6. In case other information is needed, please provide the following for the POC *(if different from the undersigned*):
Name _____ Telephone # (_____)_____
Email Address _____

| | | |
|---|---|---|
| Signature of RSO: | | |
| Print Name: | | |
| Date: | | |
| Telephone #: | DSN: | Commercial: ( ) - |
| FAX #: | | |
| Email Address: | | |

*NOTE: Copies of this form must be made by the customer.*